

Department of Health and Human Services

**OFFICE OF  
INSPECTOR GENERAL**

**CENTERS FOR DISEASE CONTROL AND  
PREVENTION'S EDUCATIONAL  
RESOURCE CENTERS**



**JUNE GIBBS BROWN**  
Inspector General

**MARCH 1996**  
**OEI-04-92-00900**

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OEI's Atlanta Regional Office prepared this report under the direction of Jesse J. Flowers, Regional Inspector General, and Christopher Koehler, Deputy Regional Inspector General. Principal OEI staff included:

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# EXECUTIVE SUMMARY

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## PURPOSE

To determine the extent that Educational Resource Center graduates, supported by the National Institute for Occupational Safety and Health, pursued careers in the occupational safety and health field.

## BACKGROUND

The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), provides grant funds to 14 university-affiliated centers that provide training on occupational safety and health. The centers, known as Educational Resource Centers (ERCs), were initiated in 1977 in response to the Occupational Safety and Health Act of 1970. The Act mandated that the Secretary of Health and Human Services "ensure an adequate supply of trained professionals for the occupational safety and health field." NIOSH funding for the Centers was \$9 million in FY 1994.

We surveyed all 14 ERCs to determine the extent that Educational Resource Center graduates, supported by NIOSH, pursued occupational safety and health careers. All 14 ERCs responded to our survey. We also randomly sampled 205 graduates to obtain their perception on the overall effectiveness of training they received. About 55 percent (112) of the 205 sampled graduates completed and returned our survey instrument.

## FINDINGS

### *Most NIOSH-supported graduates pursued occupational safety and health careers*

According to both our survey of ERCs and graduates, at least eighty-two percent of the graduates obtained work in the occupational safety and health field. At 9 of the 14 ERCs, over 90 percent of NIOSH-supported graduates pursued occupational safety and health careers. Of those students who graduated during the 5-year period (1989-1994), 80 percent are still working in their chosen occupational safety and health field.

### *About half of the NIOSH-supported graduates pursued occupational safety and health careers in private organizations*

Of the 928 NIOSH-supported ERC graduates pursuing occupational safety and health careers between 1989-1994, about 52 percent pursued careers in private organizations. Forty-five percent of the graduates pursued careers in government or academia. A very small percentage of graduates are in settings other than private, government, or academia.

***NIOSH-supported graduates considered Educational Resource Center training to be high quality***

Seventy percent of the responding graduates rated the quality of educational resource center training as excellent. Ninety-four percent of graduates told us that the ERC training adequately prepared them for an occupational safety and health career.

**CONCLUSION**

As mandated by the Occupational Safety and Health Act of 1970, ERCs successfully train and graduate students for careers in occupational safety and health. We are making no recommendations but have included in our report a number of suggestions from graduates for improving the curriculum.

**AGENCY COMMENTS**

The CDC/NIOSH concurred with the findings of our report. Appendix C shows the full text of CDC's comments.

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# INTRODUCTION

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## PURPOSE

To determine the extent that Educational Resource Center graduates, supported by the National Institute for Occupational Safety and Health, pursued occupational safety and health careers.

## BACKGROUND

The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), provides grant funds to 14 university-affiliated centers that provide training on occupational safety and health. The centers, known as Educational Resource Centers (ERCs), were initiated in 1977 in response to the Occupational Safety and Health Act of 1970. The Act mandated that the Secretary of Health and Human Services "ensure an adequate supply of trained professionals for the occupational safety and health field."

The Educational Resource Centers administer four core academic programs -- industrial hygiene, occupational medicine, occupational health nursing, and occupational safety. Educational Resource Centers provide full and part-time career training for students pursuing masters and doctoral degrees in occupational safety and health. The Centers also provide cross-training for practitioners and for students pursuing degrees in other, related fields.

Grant funds are awarded to either one institution or a consortia of schools which must meet requirements for academic training in three of the four core programs. The Centers must also provide continuing education for practicing professionals, an outreach program to other private and public educational institutions, and multidisciplinary interaction among students.

Over the past three fiscal years, NIOSH funding to ERCs has remained fairly constant. For example, NIOSH funded the ERCs at \$8.6, \$9.1, and \$9.0 million respectively for FYs 1992, 1993, and 1994.

## METHODOLOGY

We surveyed all 14 ERCs. We mailed survey instruments to 11 ERCs, and obtained information from the 3 remaining ERCs through on-site interviews. Appendix A identifies the 14 NIOSH-supported ERCs.

To determine whether or not ERC graduates pursued careers in occupational safety and health fields, we first asked officials at all 14 ERCs to provide data showing number of students graduated and their career choices over the last five years (1989-

1994). We stratified that data by (1) core program [Industrial Hygiene, Occupational Health Nursing, Occupational Safety, and Occupational Medicine], (2) year, and (3) individual ERC. We then calculated percentage of students pursuing careers in the occupational safety and health field.

Next, to obtain graduates perceptions on ERC training, we randomly selected 205 graduates from 13 of the 14 ERCs during the 5-year period (1989-1994). We excluded graduates from one of the 14 ERCs because university policy precludes release of student names and addresses.

We surveyed the graduates in June 1995 to assess the overall effectiveness of the training they received while attending an ERC. For example, we asked them (1) to rate the quality of the education they received, and (2) whether or not the training prepared them for an occupational safety and health career.

One hundred twelve of the graduates we surveyed completed and returned our questionnaire (55 percent). At the 90 percent level of confidence, this gives us a precision of +/- 10 percentage points. Ninety-three graduates did not respond to our survey. We concluded from our analysis of non-respondents and respondents that there is no significant bias in our survey results which are related to academic core, year of graduation, or geographic location of the Centers. Appendix B provides details of this analysis.

Finally, we obtained ERC funding data from CDC/NIOSH officials for the past three fiscal years.

To develop findings for this report, we weighted graduate responses according to the proportion of graduates in each core program to the total ERC population.

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This inspection was conducted in accordance with *Quality Standards for Inspections* issued by the President's Council on Integrity and Efficiency.

# FINDINGS

## MOST NIOSH-SUPPORTED GRADUATES PURSUED OCCUPATIONAL SAFETY AND HEALTH CAREERS

### *Over 80 Percent Of NIOSH-Supported Graduates Pursued Occupational Safety And Health Careers Over The Last 5 Years*

NIOSH-supported graduates pursuing occupational safety and health careers has remained fairly constant over the last five years. Table 1 shows that, according to data furnished by the ERCs, between 84 and 91 percent of the graduates pursued occupational safety and health careers over the 5 year period of our study. Likewise, a weighted 82 percent of the 112 graduates responding to our survey told us that upon graduating from an ERC they obtained work in the occupational safety and health field.

TABLE 1

<b>NIOSH-SUPPORTED GRADUATES PURSUING OCCUPATIONAL SAFETY AND HEALTH CAREERS ANNUALLY</b>						
Data Represents All 14 ERCs And 4 Core Programs						
	1989-1990	1990-1991	1991-1992	1992-1993	1993-1994	Total 5-Years
<b># of Graduates</b>	202	220	193	225	222	1,062
<b># Graduates Pursuing Careers in Occupational Safety and Health</b>	170	195	176	195	192	928
<b>% Graduates Pursuing Careers in Occupational Safety and Health</b>	84%	89%	91%	87%	86%	87%

The high employment rate was obtained even though the ERCs did not provide "formal" job placement services. A weighted 67 percent of the graduates responding to our survey told us that their ERC did not provide formal job placement services. They said they found occupational safety and health careers by word of mouth, networking, personal contacts, ads in professional journals, job bulletin boards, and faculty advisors. The ERCs we contacted confirmed the lack of formal job placement services. However, ERC officials advised that the ERCs do help graduates find career opportunities through "informal" means. For example, networking, faculty contacts, word of mouth, and posting job announcements.

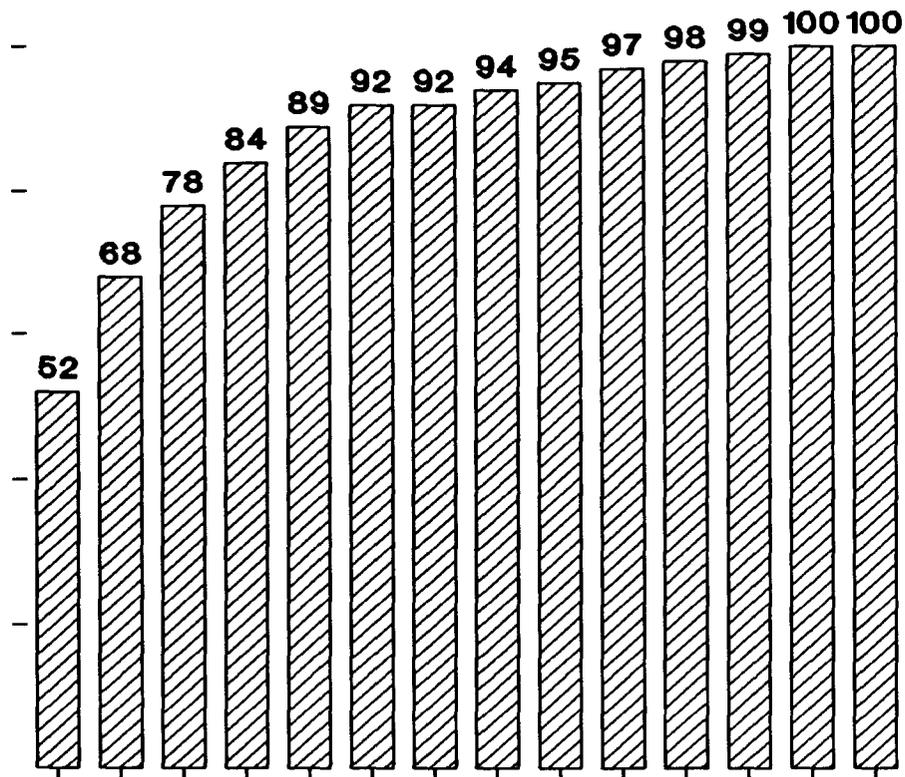
***At 9 Of The 14 Educational Resource Centers, Over 90 Percent Of NIOSH-Supported Graduates Pursued Occupational Safety And Health Careers***

Among the 14 ERCs, the percentage of NIOSH-supported ERC graduates who pursued occupational safety and health careers ranged from 52 to 100 percent over the last 5 years. However, Figure 1 shows that between 92 and 100 percent of the graduates at 9 of the ERCs pursued occupational safety and health careers during the five year period.

**FIGURE 1**

**PERCENT OF GRADUATES PURSUING CAREERS  
IN OCCUPATIONAL SAFETY AND HEALTH**

**5-Year Period: 1989-1994**



**14 Educational Resource Centers**

***NIOSH-Supported Graduates Pursued Careers In Each Of Four Core Occupational Safety And Health Fields***

According to data furnished by ERC officials, graduates find careers in each of the four occupational safety and health core programs. Table 2 shows that over the five year period included in our survey, graduate employment ranged from 75 percent in the Occupational Safety program to 92 percent in the Industrial Hygiene program.

**TABLE 2**

<b>NIOSH-SUPPORTED GRADUATES PURSUED CAREERS IN EACH CORE PROGRAM</b>					
<b>Data Represents 5-Year Period: 1989-1994 For All 14 ERCs</b>					
	<b>OCCUPATIONAL SAFETY</b>	<b>OCCUPATIONAL HEALTH NURSING</b>	<b>OCCUPATIONAL MEDICINE</b>	<b>INDUSTRIAL HYGIENE</b>	<b>ALL CORES</b>
<b># of Graduates</b>	146	236	193	487	1,062
<b># Pursuing Careers in Each Core Program</b>	109	195	174	450	928
<b>% Graduates Pursuing Careers in Each Core Program</b>	75%	83%	90%	92%	87%

***Most Graduates Tend To Continue Occupational Safety And Health Careers***

According to the graduates who responded to our survey, a weighted 80 percent who graduated between 1989 and 1994 were still working in their chosen occupational safety and health field at the time of our survey. The ERC officials we surveyed corroborated the statements of the graduates. They told us that based on their follow-up surveys, graduates remained employed in the occupational safety and health field for their entire careers -- with few exceptions.

## **ABOUT HALF OF THE NIOSH-SUPPORTED GRADUATES PURSUED OCCUPATIONAL SAFETY AND HEALTH CAREERS IN PRIVATE ORGANIZATIONS**

Of the 928 NIOSH-supported ERC graduates pursuing occupational safety and health careers between 1989-1994, about

- ▶ 52 percent pursued careers in private organizations,
- ▶ 26 percent pursued careers in government,
- ▶ 19 percent pursued careers in academia, and
- ▶ 3 percent are in settings other than private, government, or academia.

NIOSH-supported graduates who did not pursue an occupational safety and health career did not do so because they were (1) pursuing other degrees (e.g. medical, doctoral), (2) working in another field (e.g., home health care), or (3) staying at home to raise children.

## **NIOSH-SUPPORTED GRADUATES CONSIDERED EDUCATIONAL RESOURCE CENTER TRAINING TO BE HIGH QUALITY**

Almost all graduates perceived educational resource center training to be a high quality academic program. Generally, they commented that the Centers used knowledgeable and experienced faculty and provided a comprehensive well structured curriculum. A weighted 70 percent of the graduates responding to our survey rated the quality of educational resource center training as excellent. A weighted 20 percent rated the quality as good, 9 percent rated it average, and about 1 percent rated it poor.

### ***Educational Resource Centers Prepared Graduates For Occupational Safety And Health Careers***

A weighted 94 percent of graduates responding to our survey told us that the ERC training adequately prepared them for an occupational safety and health career. A weighted 75 percent of graduates we surveyed said the curriculum was appropriately balanced between theory and hands-on training experience.

## *NIOSH-Supported Graduates Suggested Improvements For The Educational Resource Center Curriculum*

About half of the graduates suggested improvements for the ERC curriculum. The changes they suggested varied by core program as summarized below. The suggestions were not made by all graduates at all ERCs, but merely represent a sampling of suggested improvements.

### Occupational Health Nursing

- ▶ Provide more hands-on training as well as more exposure to various occupational clinical sites
- ▶ Add additional courses on worker's compensation, toxicology, orthopedics, and epidemiology
- ▶ Include more information on specific OSHA regulations and how to interpret those regulations

### Industrial Hygiene

- ▶ Place more emphasis on hazardous waste management
- ▶ Provide seminars that focus on current issues and new regulations currently affecting the industrial hygiene field
- ▶ Offer courses on indoor air quality, industrial toxicology, management and communication, safety, analytical techniques, and sampling strategies

### Occupational Safety

- ▶ Focus more on the economic/loss control aspect of curriculum to better prepare graduates to "sell" safety to management
- ▶ Increase instruction in industrial hygiene

### Occupational Medicine

- ▶ Include toxicology and computer courses
- ▶ Expand epidemiology course
- ▶ Increase clinical exposure

ERC officials told us that in many instances, the changes suggested by graduates had already been implemented. A few of the graduates also commented that some of their suggested changes had been implemented.

**EDUCATIONAL RESOURCE CENTERS ARE SUCCESSFUL IN SUPPLEMENTING NIOSH FUNDING**

Federal regulations published by NIOSH/CDC require ERCs to use other sources of funds to supplement NIOSH grant funds. Sources for other support include other Federal grants, States and other public agencies, and the private sector, including grants from foundations and corporate endowments, and gifts.

During the 1993-1994 program year, ERCs obtained \$21.4 million from non-NIOSH sources such as Veterans Administration, Department of Energy, Chevron, Eastman Kodak, and individual universities. For every NIOSH dollar, ERCs obtained \$2.35 from non-NIOSH sources.

Table 3 shows that during the 1993-1994 program year, non-NIOSH funding sources provided 70 percent of the funding for ERCs.

**TABLE 3**

<b>SOURCES OF FUNDING FOR EDUCATIONAL RESOURCE CENTERS</b>		
<b>1993-1994 Program Year - All 14 ERCs</b>		
CDC/NIOSH	\$ 9,093,587	30%
OTHER FEDERAL	\$11,899,866	39%
STATE	\$ 6,436,058	21%
PRIVATE/OTHER	\$ 3,070,565	10%
<b>TOTAL</b>	<b>\$30,500,167</b>	<b>100%</b>

**CONCLUSION**

As mandated by the Occupational Safety and Health Act of 1970, ERCs successfully train and graduate students for careers in the occupational safety and health field. We are making no recommendations but have included in our report a number of suggestions from graduates for improving the curriculum.

**AGENCY COMMENTS**

The CDC/NIOSH concurred with the findings of our report. Appendix C shows the full text of CDC's comments.

# APPENDIX A

## NIOSH-FUNDED EDUCATIONAL RESOURCE CENTERS

ERC NAME	CITY, STATE
Deep South Center for Occupational Health and Safety (University of Alabama at Birmingham; Auburn University)	Birmingham, AL
Northern California Center for Occupational and Environmental Health (University of California at Berkeley, Davis and San Francisco)	Berkeley, CA
Southern California Educational Resource Center (University of Southern California, Los Angeles)	Los Angeles, CA
The Great Lakes Center for Occupational and Environmental Health and Safety (University of Illinois at Chicago)	Chicago, IL
Johns Hopkins Educational Resource Center (Johns Hopkins University)	Baltimore, MD
Harvard Educational Resource Center (Harvard School of Public Health and Simmons College)	Boston, MA
Michigan Center for Occupational Health and Safety Engineering (University of Michigan)	Ann Arbor, MI
Midwest Center for Occupational Health and Safety (University of Minnesota, St. Paul-Ramsey Medical Center)	Minneapolis, MN
New York/New Jersey Educational Resource Center (Mount Sinai School of Medicine; Hunter College School of Health Sciences; New Jersey Institute of Technology; New York University Medical Center; University of Medicine & Dentistry of New Jersey)	New York, NY
North Carolina Educational Resource Center (University of North Carolina, Duke University Medical Center)	Chapel Hill, NC
University of Cincinnati	Cincinnati, OH
Southwest Center for Occupational and Environmental Health (University of Texas, Houston)	Houston, TX
Rocky Mountain Center for Occupational and Environmental Health (University of Utah)	Salt Lake City, UT
Northwest Center for Occupational Health and Safety (University of Washington)	Seattle, WA

# APPENDIX B

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## ANALYSIS OF RESPONDENTS VS. NON-RESPONDENTS

A consideration in surveys of this type is that the results may be biased if non-respondents are significantly different from respondents. To determine whether significant differences exist in this survey, we compared academic core selection by graduates, year of graduation, and geographical location of the ERC's attended by the 112 respondents and 93 non-respondents. Our analysis revealed no significant difference. Therefore, the possibility of bias due to non-response is limited.

To test for bias in respondents versus non-respondents, we used a Two-way Contingency Table analysis with the Chi-Square test. We calculated the expected values for respondents and non-respondents assuming that respondents and non-respondents are independent.

For our test of bias by academic core program and geographical location, we chose an alpha value of .05 with 3 degrees of freedom. That produced a Chi-Square value of 7.815.

Our test statistic was 6.15 for our analysis by core program. This leads us to a conclusion that classification of respondents and non-respondents are independent by core program.

<b>NON-RESPONDENT ANALYSIS BY CORE PROGRAM</b>					
	<b>Occupational Safety</b>	<b>Occupational Health Nursing</b>	<b>Occupational Medicine</b>	<b>Industrial Hygiene</b>	<b>TOTALS</b>
<b>Sample</b>	45	52	48	60	205
<b># of Respondents</b>	19	33	30	30	112
<b># of Non- Respondents</b>	26	19	18	30	93

Our test statistic for our analysis by geographical location was 2.557. This also leads us to a conclusion that classification of respondents and non-respondents are independent by geographical location.

<b>NON-RESPONDENT ANALYSIS BY ERC IN FOUR GEOGRAPHICAL REGIONS</b>			
	<b>Sample</b>	<b># of Respondents</b>	<b># of Non-Respondents</b>
Northeast	46	22	24
Southeast	41	20	21
Midwest	62	36	26
West	56	34	22
<b>TOTALS</b>	<b>205</b>	<b>112</b>	<b>93</b>

For our test for bias based on year of graduation, we chose an alpha value of .05 with 4 degrees of freedom. That produced a Chi-Square value of 9.488. We used 4 degrees of freedom for this test because we analyzed 5 categories of data.

Our test statistic was 1.793. This leads us to a conclusion that classification of respondents and non-respondents are independent by their year of graduation.

<b>NON-RESPONDENT ANALYSIS BY YEAR</b>						
	<b>1989-90</b>	<b>1990-91</b>	<b>1991-92</b>	<b>1992-93</b>	<b>1993-94</b>	<b>TOTALS</b>
<b>Sample</b>	46	34	42	45	38	205
<b># of Respondents</b>	22	19	26	25	20	112
<b># of Non-Respondents</b>	24	15	16	20	18	93

# APPENDIX C

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## CDC COMMENTS



## DEPARTMENT OF HEALTH &amp; HUMAN SERVICES

Public Health Service  
Centers for Disease Control  
and Prevention (CDC)

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**Memorandum**

Date FEB 6 1996

From Associate Director for Management and Operations, CDC

Subject CDC Comments on IG Draft Report

To Peggy Daniel  
Office of Inspector General  
Office of Evaluations and Inspections

The IG Draft Report: "CDCs Educational Resource Centers" has been reviewed by Dr. Linda Rosenstock, Director, NIOSH, and by grants staff members, Jay Bainbridge, John Talty and Bernadine Kuchinski.

There are no comments regarding any changes or additions to the document.

Dr. Rosenstock would like to thank the Inspector General and her staff for the quality and quantity of work undertaken in carrying out this inspection and producing the final report. During the course of this project they have been very cooperative in working with NIOSH staff to learn about the various Center programs and their activities. She is pleased with the results of the report and believes they will be useful in helping NIOSH to plan and monitor programmatic aspects of these grants and others that may be supported in the future.

Dr. Rosenstock would also be happy to cooperate on any grant-related projects that the Inspector General's office would like to conduct in the future. For example, she would be willing to meet with IG and CDC staff to discuss innovative ways to explore the productivity of the small training grant programs also supported by NIOSH.

  
Arthur C. Jackson